

IN THE CLAIMS:

What is claimed is:

1. An imaging apparatus comprising:
5 an image sensor for producing electronic signals corresponding to optical information representative of a target image;
a lens assembly for focusing the target image on the image sensor; and
at least one piezo actuator assembly configured to move the lens assembly to focus the target image on the image sensor.

10 2. The imaging apparatus as recited in claim 1, further comprising a lens guidance assembly, wherein the lens assembly is moved along the lens guidance assembly to focus the target image on the image sensor.

15 3. The imaging apparatus as recited in claim 2, wherein the lens guidance assembly comprises a pair of living hinges.

4. The imaging apparatus as recited in claim 2, wherein the lens guidance assembly comprises a cylindrical bushing.

20 5. The imaging apparatus as recited in claim 1, wherein the image sensor comprises a charge coupled device.

6. The imaging apparatus as recited in claim 1, wherein the at least one piezo actuator assembly comprises a piezo actuator, a tip extending from a distal end of the piezo actuator and a spring positioned adjacent a proximal end of the piezo actuator.

5 7. The imaging apparatus as recited in claim 6, wherein the tip is in contact with the lens assembly such that movement of the tip causes movement of the lens assembly.

8. The imaging apparatus as recited in claim 1, wherein the optical information comprises an array of pixel information.

10 9. The imaging apparatus as recited in claim 8, wherein the array of pixel information is two-dimensional.

10. The imaging apparatus as recited in claim 1, wherein the at least one piezo
15 actuator assembly is positioned adjacent to the lens assembly.

11. The imaging apparatus as recited in claim 1, further comprising control and logic circuitry for processing the electronic signals produced by the image sensor.

20 12. The imaging apparatus as recited in claim 1, wherein the at least one piezo actuator assembly is configured to automatically move the lens assembly to focus the target image on the image sensor.

13. The imaging apparatus as recited in claim 1, wherein the target image is a barcode.

14. The imaging apparatus as recited in claim 1, wherein the imaging apparatus is
5 configured to be less than two cubic inches in volume.

15. The imaging apparatus as recited in claim 1, further comprising an illumination source for illuminating a target area.

10 16. The imaging apparatus as recited in claim 1, further comprising at least two piezo actuator assemblies configured in opposing directions and in contact with a longitudinal flange extending from the lens assembly such that movement of tips of the piezo actuator assemblies causes movement of the lens assembly via the flange.

15 17. The imaging apparatus as recited in claim 2, further comprising at least two piezo actuator assemblies configured in opposing directions and in contact with the lens guidance assembly such that movement of the piezo actuators cause movement of the lens assembly.

18. A method of reading an image with an imaging apparatus, the method comprising
20 the steps of:

producing electronic signals in an image sensor, wherein the electronic signals correspond to optical information representative of a target image;

focusing the target image on the image sensor through a lens assembly; and

moving the lens assembly to focus the target image on the image sensor via a piezo actuator assembly.

19. The method as recited in claim 18, further comprising the step of determining a
5 distance between the imaging apparatus and the target image.

20. The method as recited in claim 18, further comprising the step of transmitting the electronic signals to an image processing system which is configured to execute a series of programmable instructions to identify the target image.

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21. A method of focusing an image with an imaging apparatus, the method comprising the steps of:

determining a distance between the imaging apparatus and a target image;

15 correlating the determined distance to the target image to a position of a lens guidance assembly;

determining a current position of a lens assembly with respect to the position of the lens guidance assembly;

determining an amount of distance that the lens assembly needs to be moved to focus the target image on an image sensor; and

20 moving the lens assembly the determined amount of distance, to focus the target image on the image sensor, wherein the lens assembly is moved a determined distance via a piezo actuator assembly to focus the target image on the image sensor.

22. A subassembly for an imaging apparatus, the subassembly comprising:

a housing;

a lens assembly housed within the housing, the lens assembly configured to focus

a target image on an image sensor; and

5 a piezo actuator assembly configured to move the lens assembly to focus the

target image on the image sensor.